WHAT IS CLAIMED IS:

1. A receiving method in a receiver demodulating K user signals in a plurality of user signals transmitted on the same communication channel, said receiver comprising K signal extraction parts, a signal estimation part, K joint probability calculation parts and a multiplying part, said receiving method comprising the steps of:

an ith ($1 \leqq i \leqq K$) signal extraction part extracting ith to Kth user signals;

an ith joint probability calculation part calculating a joint probability density function that any signal set in said ith to Kth user signals will be obtained if ith to Kth user signals estimated by said signal estimation part are assumed to be received;

said multiplying part multiplying probability density functions calculated by said joint probability calculation parts so that a multiplied value is obtained; and

said signal estimation part estimating first to Kth user signals which maximize said multiplied value, and outputting said first to Kth user signals to said joint probability calculation parts.

2. The receiving method as claimed in claim 1, said receiver further comprising a user estimation part, said receiving method further comprising the steps of:

said user estimation part determining which user signals should be extracted by said signal extraction parts according to variation of

communication channel state such that said
probability density functions obtained by said joint
probability calculation parts become maximum; and

said signal extraction parts extracting
5   user signals determined by said user estimation part.

10   3. The receiving method as claimed in
claim 1, said receiver further comprising K adaptive
control parts, said receiving method further
comprising the steps of:

an ith adaptive control part determining
15   weight parameters on the basis of received signals
and ith to Kth user signals estimated by said signal
estimation part according to variation of
communication channel state; and

said ith signal extraction part assigning
20   weights to said received signals by using said
weight parameters.

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             4. The receiving method as claimed in
claim 1, said receiver further comprising an
adaptive control part, said receiving method further
comprising the steps of:
30   said adaptive control part determining
weight parameters on the basis of received signals
according to variation of communication channel
state, and

each of said signal extraction parts
35   assigning weights to received signals by using
weight parameters determined by said adaptive
control part.

5   5. A receiving method in a receiver
demodulating K user signals in a plurality of user
signals transmitted on the same communication
channel, said receiver comprising K signal
extraction parts, a signal estimation part, K log
10   likelihood calculation parts and an adding part,
said receiving method comprising the steps of:
           an ith $(1 \leqq i \leqq K)$ signal extraction part
extracting ith to Kth user signals;
           an ith log likelihood calculation part
15   calculating a logarithm of a joint probability
density function that any signal set in said ith to
Kth user signals will be obtained if ith to Kth user
signals estimated by said signal estimation part are
assumed to be received;
20   said adding part adding logarithms
calculated by said log likelihood calculation parts
so that an added value is obtained; and
           said signal estimation part estimating
first to Kth user signals which maximize said added
25   value, and outputting said first to Kth user signals
to said log likelihood calculation part.

30   6. The receiving method as claimed in
claim 5, said receiver further comprising a user
estimation part, said receiving method further
comprising the steps of:
           said user estimation part determining
35   which user signals should be extracted by said
signal extraction part according to variation of
communication channel state such that said

logarithms obtained by said log likelihood
calculation parts become maximum; and

said signal extraction parts extracting
user signals determined by said user estimation part.

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7. The receiving method as claimed in
10 claim 5, said receiver further comprising K adaptive
control parts, said receiving method further
comprising the steps of:

an ith adaptive control part determining
weight parameters on the basis of received signals
15 and ith to Kth user signals estimated by said signal
estimation part according to variation of
communication channel state; and

said ith signal extraction part assigning
weights to said received signals by using said
20 weight parameters.

25 8. The receiving method as claimed in
claim 5, said receiver further comprising an
adaptive control part, said receiving method further
comprising the steps of:

said adaptive control part determining
30 weight parameters on the basis of received signals
according to variation of communication channel
state; and

each of said signal extraction parts
assigning weights to received signals by using
35 weight parameters calculated by said adaptive
control part.

9. A receiver demodulating K user signals
in a plurality of user signals transmitted on the
same communication channel, said receiver comprising
K signal extraction parts, a signal estimation part,
K joint probability calculation parts and a
multiplying part, wherein:

an ith ($1\leqq i\leqq K$) signal extraction part
extracts ith to Kth user signals;

an ith joint probability calculation part
calculates a joint probability density function that
any signal set in said ith to Kth user signals will
be obtained if ith to Kth user signals estimated by
said signal estimation part are assumed to be
received;

said multiplying part multiplies
probability density functions calculated by said
joint probability calculation parts so that a
multiplied value is obtained; and

said signal estimation part estimates
first to Kth user signals which maximize said
multiplied value, and outputs said first to Kth user
signals to said joint probability calculation part.

10. The receiver as claimed in claim 9,
said receiver further comprising a user estimation
part for determining which user signals should be
extracted by said signal extraction parts according
to variation of communication channel state such
that said probability density functions obtained by
said joint probability calculation parts become
maximum,

wherein said signal extraction parts extracts user signals determined by said user estimation part.

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11. The receiver as claimed in claim 9, said receiver further comprising K adaptive control

10 parts, wherein:
an ith adaptive control part determines weight parameters on the basis of received signals and ith to Kth user signals estimated by said signal estimation part according to variation of

15 communication channel state; and
said ith signal extraction part assigns weights to said received signals by using said weight parameters.

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12. The receiver as claimed in claim 9, said receiver further comprising an adaptive control

25 part for determining weight parameters on the basis of received signals according to variation of communication channel state,
wherein each of said signal extraction parts assigns weights to received signals by using

30 weight parameters calculated by said adaptive control part.

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13. A receiver demodulating K user signals in a plurality of user signals transmitted on the

same communication channel, said receiver comprising K signal extraction parts, a signal estimation part, K log likelihood calculation parts and an adding part, wherein:

5   an ith ($1 \leqq i \leqq K$) signal extraction part extracts ith to Kth user signals;

    an ith log likelihood calculation part calculating a logarithm of a joint probability density function that any signal set in said ith to 10 Kth user signals will be obtained if ith to Kth user signals estimated by said signal estimation part are assumed to be received;

    said adding part adds logarithms calculated by said log likelihood calculation parts 15 so that an added value is obtained; and

    said signal estimation part estimates first to Kth user signals which maximize said added value, and outputs said first to Kth user signals to said log likelihood calculation part.

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    14. The receiver as claimed in claim 13, 25 said receiver further comprising a user estimation part for determining which user signals should be extracted by said signal extraction parts according to variation of communication channel state such that said logarithms obtained by said log likelihood 30 calculation parts become maximum,

    wherein said signal extraction parts extract user signals determined by said user estimation part.

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15. The receiver as claimed in claim 13, said receiver further comprising K adaptive control parts, wherein:

an ith adaptive control part determines weight parameters on the basis of received signals and ith to Kth user signals estimated by said signal estimation part according to variation of communication channel state; and

said ith signal extraction part assigns weights to said received signals by using said weight parameters.

16. The receiver as claimed in claim 13, said receiver further comprising an adaptive control part for determining weight parameters on the basis of received signals according to variation of communication channel state,

wherein each of said signal extraction parts assigns weights to received signals by using weight parameters obtained by said adaptive control part.